程序代写代做 CS编程辅导

ISYS90045 Professional IS Consulting

WeChat: cstutorcs

Seminar 10

Assignment Project Exam Help

Problem Solving

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Learning agenda

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Intended Learning Outcomes (ILO's)

- Define and understand structured problem solving

- Define and understand unstructured problem solving

- Engage in activities and examples to gain understanding

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Problem solving

- Consultants solve problems
- IT, IS and information security consultants solve problems specific to their ...

Should we go to the cloud?	How can we improve our security environment?	How does this software best support the business?	What is our IT roadmap?
How effective is our data loss prevention?	We want to go with SAP – can you make it happen?	We're outsourcing IT – who should we go with?	We have major IT uplift going on: please manage it!

Do any of these scenarios have easy answers?

How do you even begin solving these?

Problem solving

Think of problem solving in two ways:

Structured problem solving	Unstructured problem solving

- Problems that are known, standardised and can be solved in an operational fashion
- Can be encoded into procedure documentation
- For example:

  - How do you make macaroni and cheese?
  - How do you resolve customer enquiries in a call centre?

- Problems that are open-ended, 'fuzzy', may be unique to a situation
- For example:

  - How is macaroni better than fettucine?
  - What should we do with our IT systems in the next three years?
  - Should we acquire a new business?

  How do you solve these?

Defining Problem Solving

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Problem solving

▸ It is an analytical process used to identify the possible solutions to the situation

▸ Making decisions is a part of problem solving.

▸ Problem solving is a complex process, and judgement calls (or decisions) will have to be made on the way.

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Introduction to problems and decisions

Types of problems we encounter;

- Structured
- Unstructured
- Semi structured

How does this incorporate decision making?

Programmed decisions

- E.g. Standard Operating Procedure (SOP) to eliminate individual judgment

Non Programmed decision

- E.g. Strategy to determine whether to acquire another company

Problem solving: structured

Clear definition of the:

- Goal
- Beginning state
- Actions
- End state
- Constraints

Follow similar processes for resolution

- Procedural; limited number of rules and principles
- Method for solving the problem is repeatable
- Outcomes are typically known or standardised
- Constraints are limited or are accounted for.

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Problem solving: unstructured

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▸ **'Ill-structured' problems**

 ▸ Unknown definitio... problem elements

 ▸ Multiple potential s...

 ▸ Different paths to take to get to the solution

 ▸ Uncertainty over concepts, rules to apply

 ▸ Not enough information on hand

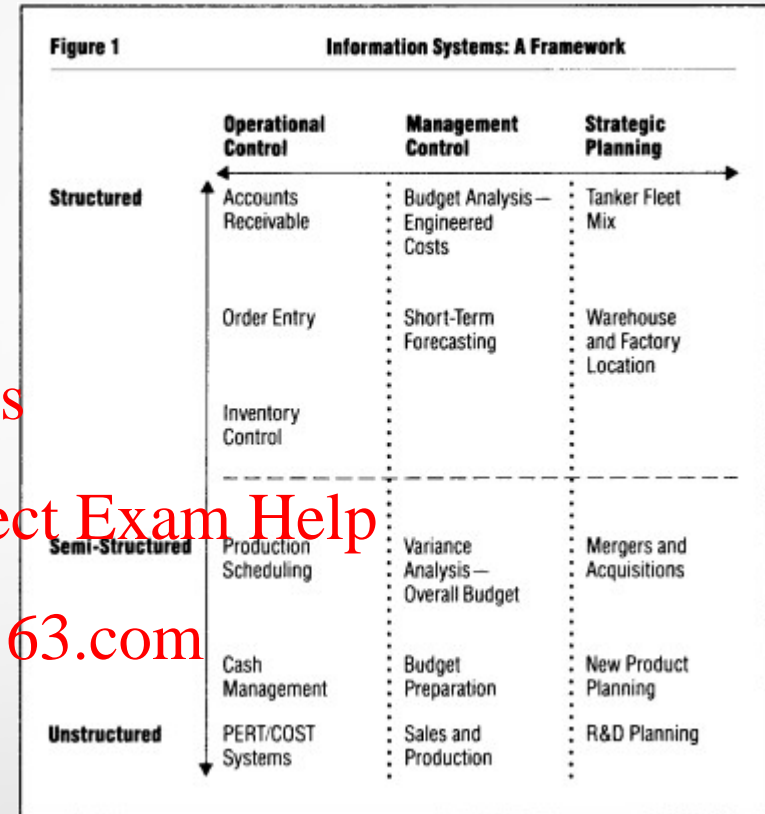 ▸ Learners need to make judgements on the problem – and defend this view!

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Figure 1	Information Systems: A Framework		
	Operational Control	**Management Control**	**Strategic Planning**
Structured	Accounts Receivable	Budget Analysis—Engineered Costs	Tanker Fleet Mix
	Order Entry	Short-Term Forecasting	Warehouse and Factory Location
	Inventory Control		
Semi-Structured	Production Scheduling	Variance Analysis—Overall Budget	Mergers and Acquisitions
	Cash Management	Budget Preparation	New Product Planning
Unstructured	PERT/COST Systems	Sales and Production	R&D Planning

Source: Gorry & Scott Morton, 1971

Types of Problems – A comparison

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Type of problem	Structured	Unstructured
Managerial level	Lower level	Upper level
Frequency	Repetitive	New, unusual, non repetitive
Information	Readily available, well formed, plentiful	Ambiguous or incomplete
Time frame for solution	Short, almost immediate	Relatively long
Solution relies on	Procedures, rules, and policies e.g. Standard Operating Procedure	Judgment and creativity, novel solutions

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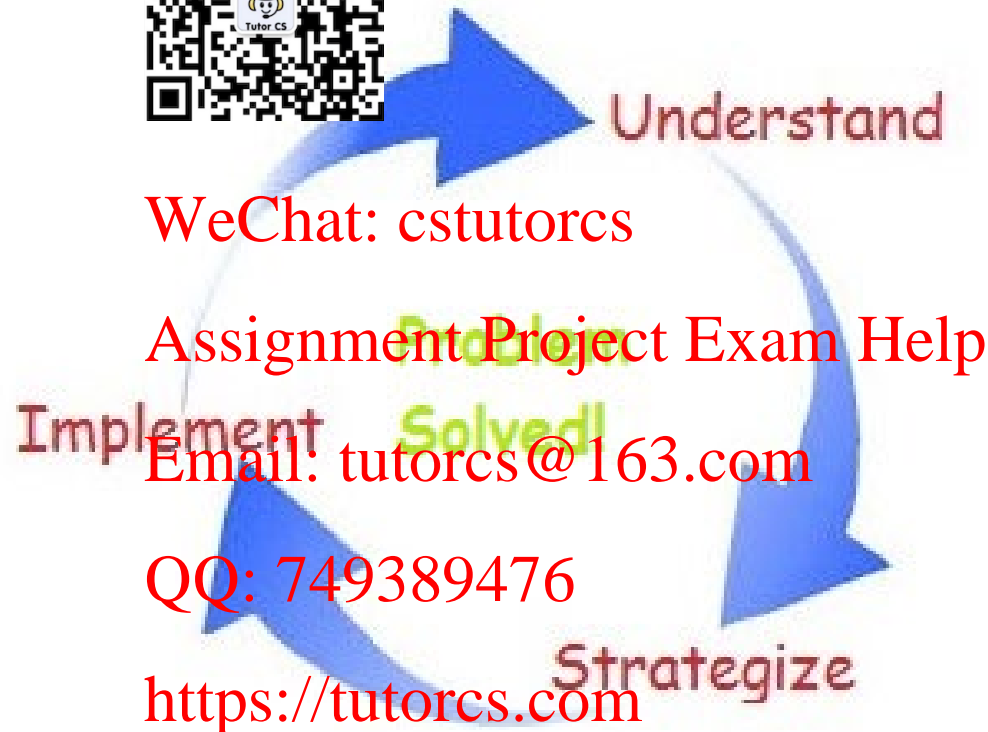
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Problem solving – An Approach

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Problem-Solving Cycle

Understand

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Strategize

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Implement

Problem Solved!

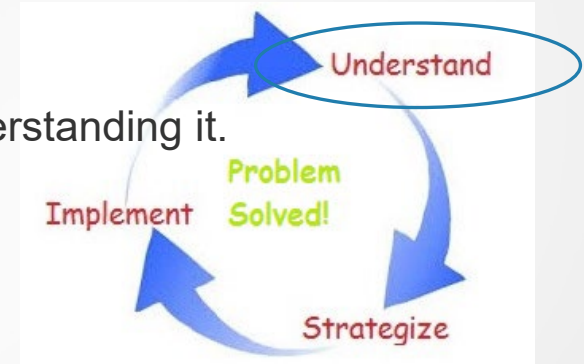# The Three Stages Explained

1. Understanding the Problem:
The most important part of solving any problem is understanding it.

Ask yourself or guide others to ask themselves the following questions:

- What am I looking for?
- What is the unknown?
- Do I understand every word and concept in the problem?
- Am I familiar with the units in which measurements are given?
- Is there information that seems missing?
- Is there information that seems superfluous?
- Is the source of information bona fide? (Think about those instances when a friend gives you a puzzle to solve and you suspect there's something wrong with the way the puzzle is posed.)

The Three Stages Explained

Strategizing:
Now that we *think* we ~~understand~~ the problem, we choose a strategy or ~~multiple strategies~~ to try to solve

Ten general strategies are:
- Logical reasoning
- Pattern recognition
- Working backwards
- Adopting a different point of view
- Considering extreme cases
- Solving a simpler analogous problem
- Organizing data
- Making a visual representation
- Accounting for all possibilities
- Intelligent guessing and testing

The Three Stages Explained

Implementing:

Implement the strategy or strategies. check reasoning and calculations.
Avoid the mistake of "doing something" before understanding or at least pursuing understanding.

Note: it is possible to have an incorrect understanding of the problem, but that is different from not even realizing that we have to understand the problem before attempting to solve it!
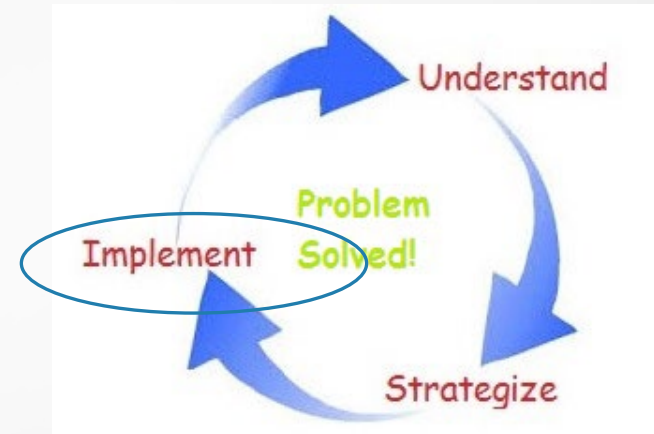
The Problem Solving Cycle

As we implement we might refine our understanding of the problem. As we refine our understanding of the problem, we can refine our strategy.
As we refine our strategy and implement a new approach, we get closer to solving the problem, etc.

Problem Solving Presentation Principles

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In business we constantly look at ways to solve prospects, clients and customers problems. When delivering al presentations consider:

The Problem
- clearly describe th   the customer has.
- Ensure that they a   s a problem and that it needs solving.
- May be necessary
- them the implications of not solving the problem and highlight the pain caused.

The cause
- Show the main causes of the problem
- Make links between causes and the problem very clear
- use a maximum of

The solution
- Show your product/service addresses the causes and fixes the problem
- Show independent reports that prove this.
- Demonstrate if possible.

Example

A car sales person asks why the customers are looking for a new car. The customer tells how the current car is expensive to run. The salesperson explains how some cars are not designed for easy service and others have inefficient engines. She then shows them a report that highlights running costs of different cars and then demonstrates models from the top two cars in the list.

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Problem solving: unstructured

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- Unstructured problem solving requires structure
- You need to break the problem down
- The below model provides an effective means of logically stepping through this process

Problem Definition	Criteria Selction	Options	Analysis	Decision	Action
• What is the nature of the problem, root cause or goal? • Consider your scope and size of application • Alternative mechanisms and paths if ideal tools are not available	• How will you distinguish between alternatives? • Qualitative vs. quantitative? • Weighting? • Risks and downsides?	• What are the alternative methods for solving the problem?	• Apply your criteria and distinguish between the alternatives • If necessary, think of mitigations for risks that you've considered	• Apply your criteria and distinguish between the alternatives	• Develop the plan to implement the decision

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Source:Rosenberg,2011

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Computing and Information Systems

Problem solving

- Problems by their domain a:
  - **Domain:** content that defines the problem's elements
    - Concepts, rules,
    - E.g. information
  - **Type:** A combination of related concepts and rules that will help solve the problem
    - E.g. information security risk management
  - **Process:** Method by which you solve the problem
    - Depends on your understanding of the problem type, goal
    - Gap between initial and goal state is the problem space
    - This can become more proceduralised as you gain experience
  - **Solution:** Achieving the goals
    - Convergent vs. divergent (one solution vs. one of many)

Source: Jonassen, 1997

Solve a problem

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- A farmer wants to sub-divide a square piece of land into 16 equal size plots give them to [QR code] .

- His only restriction

- no NGO may own [QR code] THREE pieces of the land (the colours are the plots)

- no NGO may own any land that is **adjacent in any way** to any other land they have i.e. they can never move from one piece of their land to another without going through someone else's land first

- Four proposals (colour-coded according to NGO) have been put forward – which, IF any, are acceptable ?

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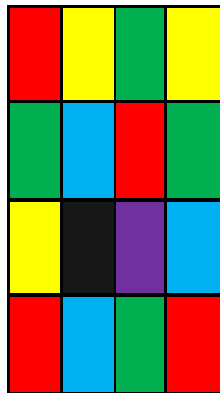
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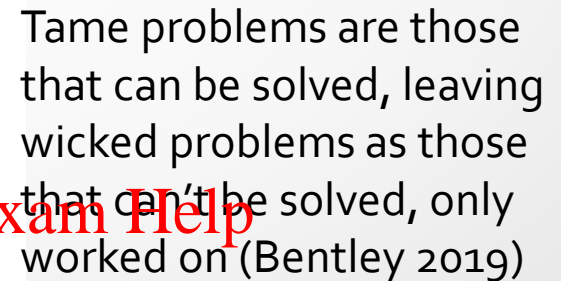
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Answer d

Solve a problem

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A   B   C   D

Answer d

Tame vs. Wicked Problems
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Tame problems are those that can be solved, leaving wicked problems as those that can't be solved, only worked on (Bentley 2019)

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Summary

It is critical to use a structured approach to solve problems. If the wrong problem is chosen, the correct root causes are not identified, the solution chosen will not improve the situation, and the problem will recur.

The foundation of Problem Solving is to spend time to properly identify and define the problem.

Never Assume

Solve it Right First Time